W91321-04-C-0023

LOGANEnergy Corp.

Marine Corps Base Kaneohe, HI
PEM Demonstration Program,
Midterm Report

Proton Exchange Membrane (PEM) Fuel Cell Demonstration
Of Domestically Produced PEM Fuel Cells in Military Facilities

US Army Corps of Engineers
Engineer Research and Development Center
Construction Engineering Research Laboratory
Broad Agency Announcement CERL-BAA-FY03

Residence of
Marine Corps Major James Bain
MCB Kaneohe Bay, HI

June 2, 2005

Executive Summary

Under terms of its FY03 DOD PEM Demonstration Contract with ERDC/CERL, LOGANEnergy has installed one Plug Power GenSys 5kWe Combined Heat and Power fuel cell power plant at MCBH Kaneohe Bay, Hawaii. The unit operates at the base housing quarters of Marine Corps Major James Bain.

This project had its genesis with LOGAN's original submittal in the CERL BAA FY01 PEM Demonstration Program. Since natural gas is not available in Hawaii, the site had to be withdrawn once it became clear that product manufacturers would not be able to deliver a reliable LPGas fuel cell for the project. Then in the summer of 2002, when the first LPGas PEM systems became available, LOGAN decided to reapply for the Hawaii site. After determining that the base still supported the initiative, LOGAN resubmitted the Kaneohe proposal in June 2003. The project kick-off meeting occurred on Oct 14, 2004 and two months later the first start occurred on Dec 14, 2004.

The Combined Heat and Power (CHP) installation operates electrically in a grid parallel/grid independent configuration that ties several kitchen appliances and convenience outlets onto the fuel cell's critical load panel. The facility's hot water heater captures the unit's waste heat output. The installation is instrumented with an external wattmeter, BTU meter, thermometer and a gas flow meter. A phone line is connected to the power plant communication's modem to call-out with alarms or events requiring service and attention. In addition, this site has a web-enabled SCADA system that provides real time operational control, management and alarming.

The site acceptance test occurred on May 12, 2005 and was enthusiastically attended by members of the base environmental and civil engineering staff. The unit performed normally during the test and the site inspection confirmed the installation followed the project plan.

Since the local gas supplier has generously offered to support the project at no cost to the base, the project will save the base $3531.80 in energy costs during the period of performance. The base POC for this project is Stephen Butala whose coordinates are: Email ButalaSG@mcbh.usmc.mi Telephone 808-257-2171, ext 258.

Table of Contents

Proposal – Proton Exchange Membrane (PEM) Fuel Cell Demonstration of Domestically Produced Residential PEM Fuel Cells in Military Facilities

1.0 Descriptive Title

Residence of Major James Bain, USMC, PEM Demonstration Program Kaneohe Bay, HI

2.0 Name, Address and Related Company Information

LOGANEnergy Corporation

1080 Holcomb Bridge Road
BLDG 100- 175
Roswell, GA 30076
(770) 650- 6388

DUNS 01-562-6211
CAGE Code 09QC3
TIN 58-2292769

LOGANEnergy Corporation is a private Fuel Cell Energy Services company founded in 1994. LOGAN specializes in planning, developing, and maintaining fuel cell projects. In addition, the company works closely with manufacturers to implement their product commercialization strategies. Over the past decade, LOGAN has analyzed hundreds of fuel cell applications. The company has acquired technical skills and expertise by designing, installing and operating over 30 commercial and small-scale fuel cell projects totaling over 7 megawatts of power. These services have been provided to the Department of Defense, fuel cell manufacturers, utilities, and other commercial customers. Presently, LOGAN supports 30 PAFC and PEM fuel cell projects at 28 locations in 14 states, and has agreements to install 15 new projects in the US and the UK over the next 18 months.

3.0 Production Capability of the Manufacturer

Plug Power manufactures a line of PEM fuel cell products at its production facility in Latham, NY. The facility produces three lines of PEM products including the 5kW GenSys5C natural gas unit, the GenSys5P LP Gas unit, and the GenCor 5kW standby power system. The current facility has the capability of manufacturing 10,000 units annually. Plug will support this project by providing remote monitoring, telephonic field support, overnight parts supply, and customer support. These services are intended to enhance the reliability and performance of the unit and achieve the highest possible customer satisfaction. Scott Wilshire is the Plug Power point of contact for this project. His phone number is 518.782.7700, and his email address is brian_davenport@plugpower.com.

4.0 Principal Investigator(s)

Name	Samuel Logan, Jr.	Keith Spitznagel
Title	President	Vice President Market Engagement
Company	Logan Energy Corp.	Logan Energy Corp.
Phone	770.650.6388 x 101	860.210.8050
Fax	770.650.7317	770.650.7317
Email	samlogan@loganenergy.com	kspitznagel@loganenergy.com

Name	Chris Davis
Title	VP Operations
Company	Logan Energy Corp.
Phone	770.855.3917
Fax	770.650.7317
Email	cdavis@loganenergy.com

5.0 Authorized Negotiator(s)

Name	Samuel Logan, Jr.	Keith Spitznagel
Title	President	Vice President Market Engagement
Company	Logan Energy Corp.	Logan Energy Corp.
Phone	770.650.6388 x 101	860.210.8050
Fax	770.650.7317	770.650.7317
Email	samlogan@loganenergy.com	kspitznagel@loganenergy.com

Name	Chris Davis
Title	VP Operations
Company	Logan Energy Corp.
Phone	770.855.3917
Fax	770.650.7317
Email	cdavis@loganenergy.com

6.0 Past Relevant Performance Information

a) Contract: PC25 Fuel Cell Service and Maintenance Contract #X1237022

Merck & Company
Ms. Stephanie Chapman
Merck & Company
Bldg 53 Northside
Linden Ave. Gate
Linden, NJ 07036
(732) 594-1686

Contract: Four-year PC25 PM Services Maintenance Agreement.
In November 2002 Merck & Company issued a four-year contract to LOGAN to provide fuel cell service, maintenance and operational support for one PC25C fuel cell installed at their Rahway, NJ plant. During the contract period the power plant has operated at 94% availability. LOGAN performs the quarterly and annual service prescribed by the UTC, and performs other maintenance as required. The periods of unavailability are chiefly due to persistent inverter problems that seem to be endemic to the Toshiba power conditioning balance of the system. Field modifications and operating adjustments have largely cured the problem. Quarterly service events take 10 hours to complete with the unit under load, and the annual event takes approximately 35 hours with the unit shut down.

b) Contract: Plug Power Service and Maintenance Agreement to support 12 5kWe GenSys 5C PEM power plants at various CA and Hawaii locations.

Plug Power
Mr. Brian Davenport.
968 Albany Shaker Rd.
Latham, NY 12110
(518) 782-7700

c) Contract: A Partners LLC; Commercial PC25 Fuel Cell Project Design, Installation and 5-year service and maintenance agreement.

Mr. Ron Allison
A Partners LLC
1171 Fulton Mall
Fresno, CA 93721
(559) 233-3262

On April 20, 2004 LOGAN completed the installation of a 600kWe PC25C CHP fuel cell installation in Fresno, CA. The system operating configurations allow for both grid parallel and grid independent energy service. The grid independent system is integrated with a Multi Unit Load Sharing (MULS) electronics package and static switch, which initial development was funded by ERDC CERL in 1999. This is the third fuel cell installation that uses the MULS System. The thermal recovery package installed in the project includes a 100-ton chiller that captures 210 degree F thermal energy supplied by the three fuel cells to support cooling loads on the first three floors of the host facility. The fuel cells also provide low-grade waste heat at 140 degrees F that furnishes thermal energy to 98 water source heat pumps located throughout the 12-story building during the winter months.

7.0 Host Facility Information

Marine Corps Base Hawaii
Supporting Readiness and Global Projection

Marine Corps Base Hawaii (MCBH) Kaneohe Bay is located on the windward side of Oahu, approximately 12 miles northeast of Honolulu. The base occupies the Mokapu Peninsula, which connects to the mainland near the cities of Kaneohe and Kailua. MCBH Kaneohe Bay is home to III Marine Expeditionary Forces, Hawaii, 1st Radio Battalion, and the Marine Corps Air Facility, Kaneohe Bay. The base's position in the Pacific makes it an ideal location for strategic deployment to the Far East. The base is also a leader in environmental protection, enhancement and conservation. The base has received numerous awards for its efforts, including the 1984 Secretary of Defense Environmental Quality Award and the 1992 Secretary of the Navy Natural Resources Conservation Award.

The main access to the base is by either highway 3 (H-3) or by Mokapu Road. Other training areas include Bellows Air Force Station eight miles to the south, the Kahuku Training Area approximately 33 miles to the north and Makua Military Reservation (MMR), which is 47 miles to the west. MCBH Kaneohe Bay has a 7,500 foot runway and supporting taxiways, which, in addition to normal air operations, are used for access to the outer island training areas. The base also has a fuel pier and waterfront area, used for loading tank landing ships (LST's) and small boats for transporting equipment off-island.

The base consists of 2,951 acres of fee simple and ceded land. Only a portion of the area (140 acres) is used as a small arms range and impact area, which is included in the DOD major training assets total. The majority of the base is located on land designated as Urban. Two sections of the base are classified conservation land, which includes the Ulupau Crater area and the Nuupia Pond area. The land south of the base is used mainly for single-family residences.

The electric service provider for MCBH Kaneohe Bay is Hawaii Electric and the LPGas provider is Aloha Gas.

The map pictured below shows the location of MCBH Kaneohe Bay relative to other geographic areas and points of interest.

8.0 Fuel Cell Installation

After reviewing several possible sites on the base, the home of Major James Bain, Figures 1-4, was selected to host the installation. Maj. Bain is the commander of the base civil engineering division and was eager to act as host for the installation. Following discussion with Maj. Bain's staff it was determined that no permits would be needed prior to installing the unit. After the completion of all installation tasks the unit was commissioned on December 13, 2004 and the first start occurred one day later on December 14. After waiting for 7 weeks to gain commercial ISP access, web connectivity occurred on February 2, 2004 whereupon the unit became fully operational.

Figure 1, Fuel Cell Pad Site

Figure 2, Fuel Cell on Pad Site with LPG tank

Figure 3, Rigging Unit onto pad

Figure 4, Wiring Metering Package

Installation Line Diagram

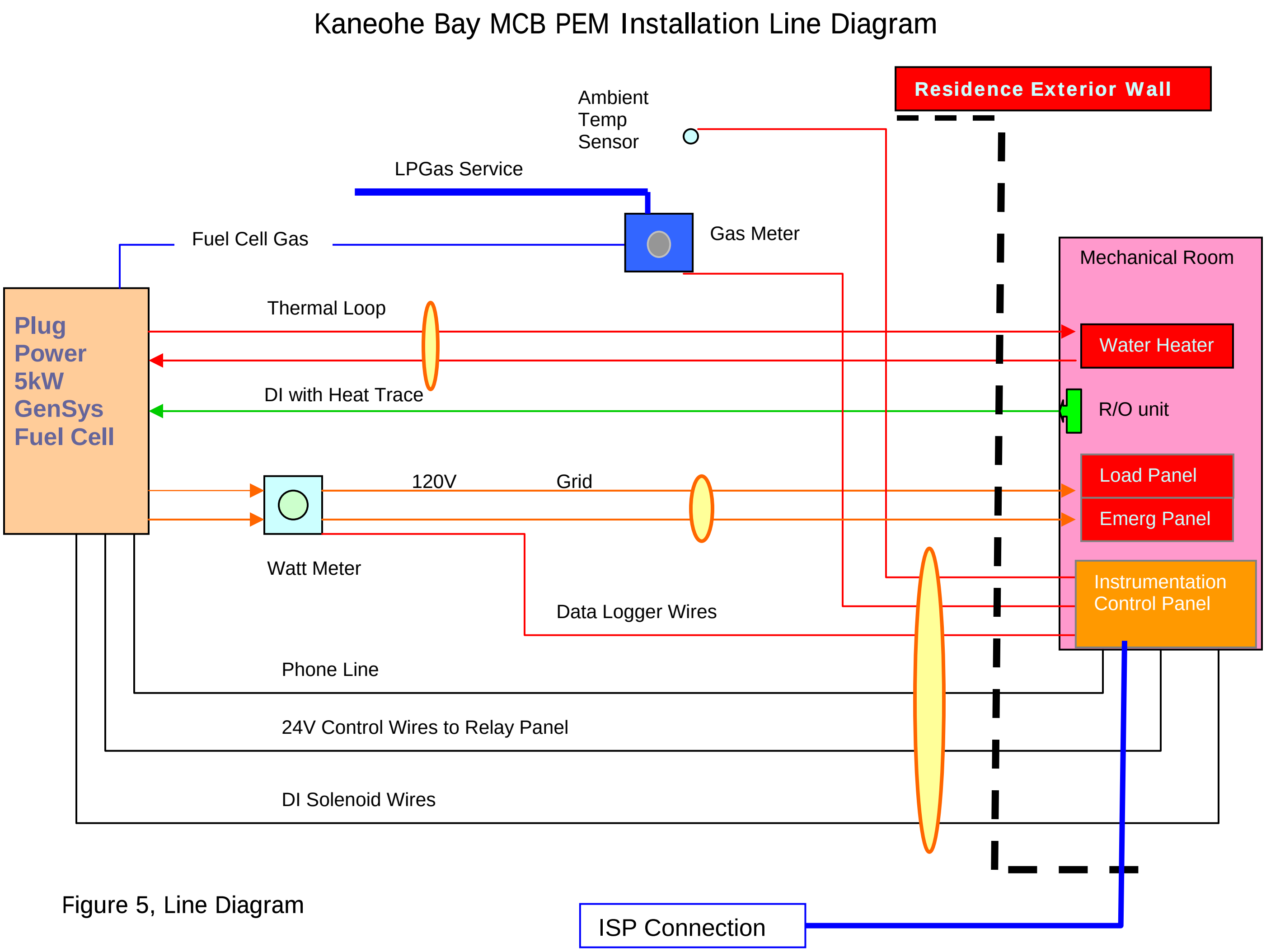


Figure 5, Line Diagram

Figure 5, above, describes a one line diagram of the MCB Kaneohe Bay fuel cell installation at the home of Marine Major James Bain. The diagram illustrates utility and control interfaces including, LPGas, power, water and instrumentation devices installed in the residential equipment room.

The electrical conduit that runs between the facility load panels and the fuel cell are approximately 40 feet. The Reverse Osmosis/DI water tubing that provides filtered process water to the power plant is approximately 40 feet distance, and the thermal recovery piping that runs between the fuel cell and the hot water heater is also approximately 40 feet.

9.0 Electrical System

Figure 6

The fuel cell inverter has a power output of 110/120 VAC at 60 Hz, matching the building distribution panel in the mechanical room with its connected loads at 110/120 VAC. The installation includes both a grid parallel and a grid independent configuration as illustrated in Figure 5 above. The unit is connected to the base grid through a 50 amp circuit breaker in the residence's existing service panel pictured at right, Figure 6. The unit's emergency conductor provides power to a new 50amp critical circuit panel that serves several kitchen appliances and other plug loads. A two-pole wattmeter, seen attached to the face of the fuel cell in Figure 4 above, monitors both the grid parallel and grid independent conductors to record fuel cell power distribution to both the existing panel and the new critical load panel. The fuel cell electrical disconnect can be seen to the right of the watt meter also in Figure 4 above. The disconnect switch allows the technician to electrically isolate the fuel cell from the residential power supply to make repairs t o the unit without causing an inconvenience to the occupants.

10.0 Thermal Recovery System

Fuel Cell waste heat flows to a Heliodyne heat transfer coil that maintains the domestic hot water tank at 130 degrees F, which is adequate to meet domestic hot water quality and demand for a family of four. The Heliodyne is a product originally developed for the solar collector industry, which has proven itself very useful for fuel cell thermal applications as well. The heat exchanger is a coil within a coil that permits a closed hot water loop to transfer heat from the fuel cell in a counter flow manner with water circulation from the tank.

Figure 7, below, illustrates how the Heliodyne transfers fuel cell waste heat to the existing hot water tank. The black “U” shaped coil is a Heliodyne Heat Exchanger seen attached to the tank. The other major thermal recovery components are indicated in the boxes below with arrows pointing to their locations.

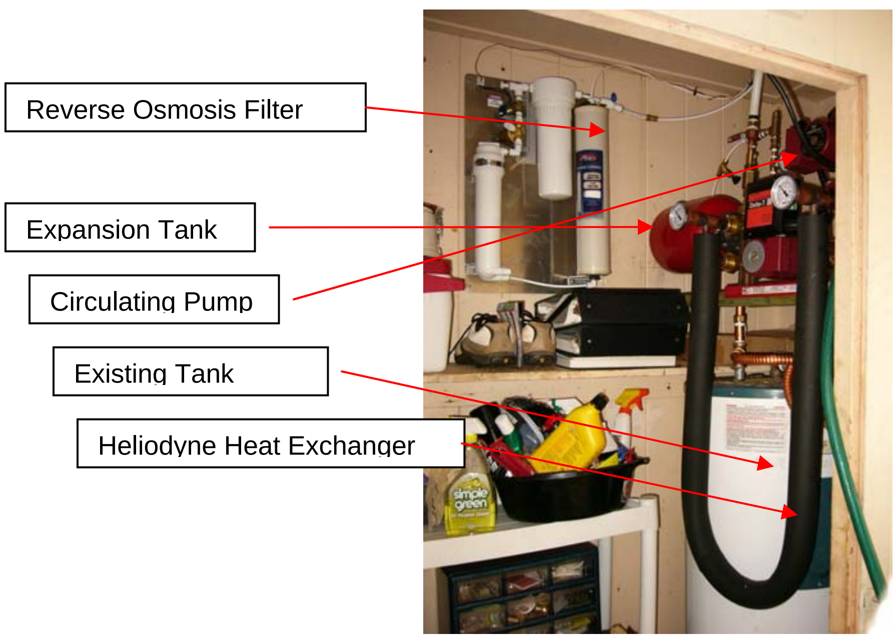


Figure 7, Thermal Recovery Package

11.0 Data Acquisition System

Figure 8, RTU Housing

Figure 8 displays a photo of the Connected Energy Remote Terminal Unit, which transmits fuel cell operating and performance data via a VPN to LOGAN's distributed generation control center in Rochester, NY.

Over the course of developing many sites in its DOD PEM Programs, LOGAN has encountered great difficulty in acquiring a dedicated phone line for the fuel cell in every case. In the best case this has delayed starting the Demonstration Period by three weeks. Most sites have proven far more difficult. These experiences have taught LOGAN to be very explicit with the host POC at the kick-off meetings concerning the necessity for providing a dedicated phone line, since much of the success of the project is dependent upon reliable communications with the unit.

As was the custom at its FY02 PEM installation sites, LOGAN decided once again to install a web-based, real time, data management and reporting system at Ft McPherson. To do this LOGAN contracted with Connected Energy Corporation, CEC, to provide the service. The drawing seen in Figure 9, below, describes the architecture of the CEC system operating at the site. The system provides a comprehensive data acquisition solution, and also incorporates remote control, alarming, remote notification, and reporting functions as well by means of a VPN that maintains connectivity between the fuel cell site and the control center in Rochester, NY.

With the introduction of this system at Kaneohe Bay, LOGAN continues to learn new lessons in Web based CHP resource management. The web communications installation at Maj. Bain's residence is provided by a local ISP, Oceanic Cable.

Another important lesson that LOGAN has learned with this system is the critical role that individual instrumentation component parts play in supplying the data to the web interface. The CE system requires very precise signals from the outputs of these devices. The gas meters, wattmeters, flow meters and thermal elements invariably require signal strength adjustment at the RTU terminals to insure that their discrete inputs are readable by the CEC system. Discovering the proper voltage range required for each signal loop is most often achieved by trial and error, requiring multiple site visits to establish a readable connection. In other instances LOGAN has discovered that flow metering devises and thermal couples often require high levels of maintenance and/or replacement to support continuous data collection.

This site has produced its own particular set of service issues with the CE system, which show up as an inability of the RTU to retrieve a constant stream of data. Instead, LOGAN has been able to retrieve only intermittent data after three months of operation. Unfortunately, after exhaustive troubleshooting the system and changing many components, the solution has not yet become apparent. IN order to correct t his deficiency, LOGAN has launched a comprehensive installation process/materials/ practices review in an all out effort to correct the problem. WE believe that is will be solved in short order.

Figure 10, on page 16, is an example of one of many data screens that are maintained by the CEC system and displayed on the web. Due to the problem described above the screen provides only incomplete data in the data display boxes. A sample data graph is also attached to Appendix 2 providing kWh data for the week of May 22, 2005.

To view the operation of this unit, online go to: https://www.enerview.com/EnerView/login.asp Then login as: logan.user and enter password: guest. Select the box labeled Kaneohe Bay within the Pacific Region. Then you may navigate the site or other LOGAN sites using the tool bars or html keys.

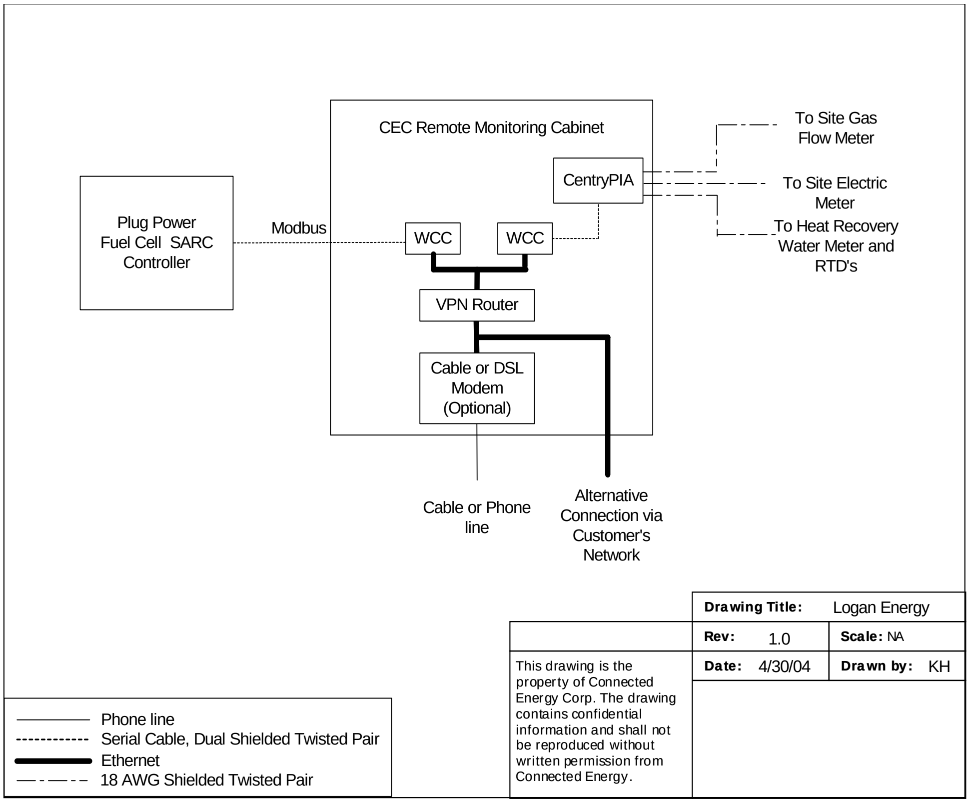


Figure 9, Connected Energy System Architecture

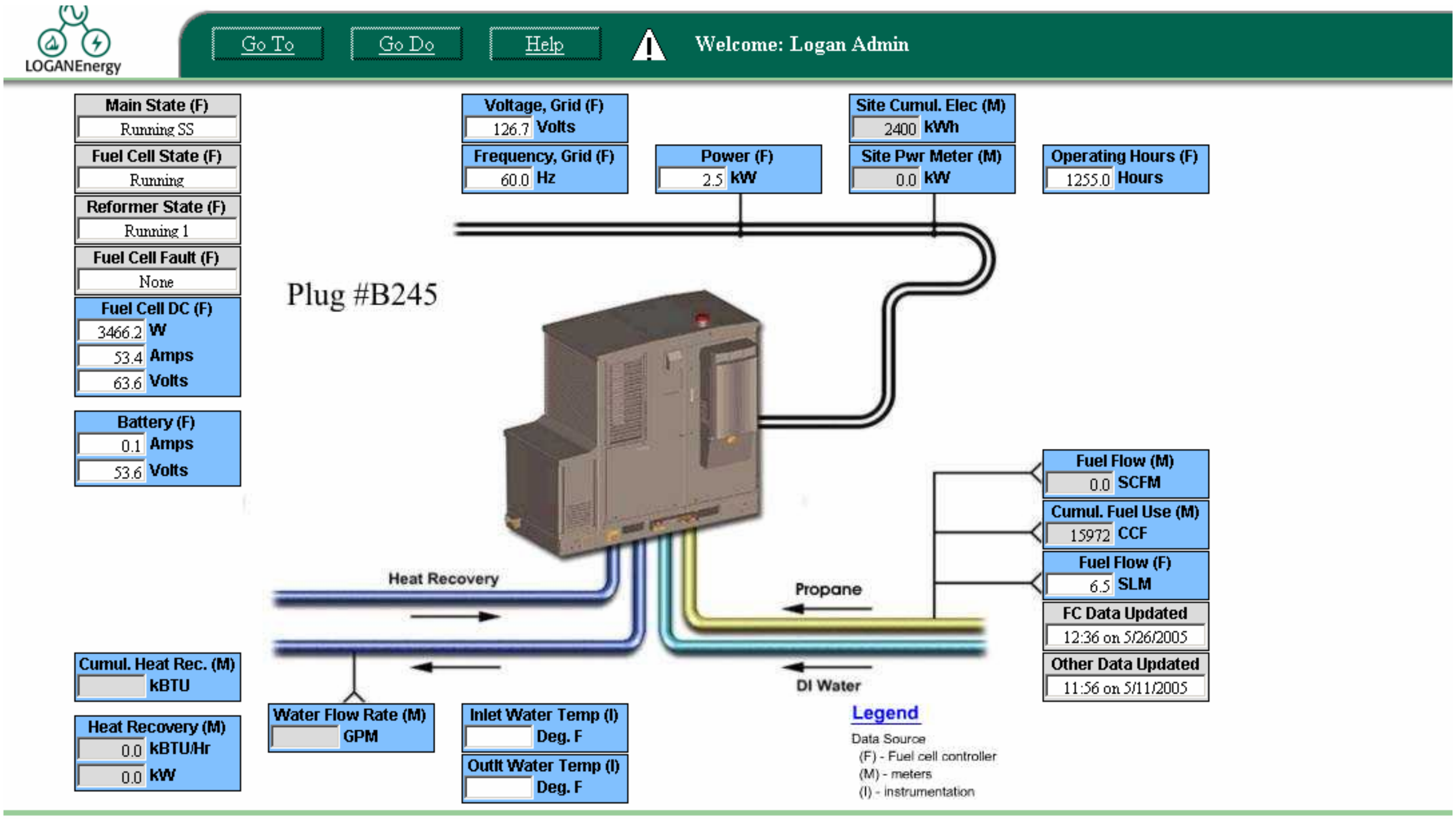


Figure 10, Connected Energy Web Data Screen

Note that due to an ongoing problem with the system's ability at this site to capture a continuous data stream, some data points were not available at the time this screen was inserted in to the body of the report.

12.0 Fuel Supply System

The Plug Power unit provided for this demonstration is an LPGas fueled system. Aloha Gas, the fuel supplier installed the 250 gallon fuel storage tank seen in the photo below labeled Figure 11. While operating at a dispatch set point of 2.5kWh, the unit consumes .53 gallons per hour. This equates to 20% electrical efficiency, which is low by conventional power generation standards. However, this is a first generation LPGas fuel cell product, and the more important issue will be to determine that the product functions in accordance with its design specifications and achieves 90% availability during the test period. When thermal recovery is added to the efficiency equation, then overall efficiency could exceed 55% under ideal circumstances.

A regulator at the fuel cell gas inlet maintains the correct fuel cell operating pressure at 14 inches water column. The size of the tank and its location in the backyard would appear to be very obtrusive for a family with young children. However, as the demonstration project is for one year Major Bain agreed to the short term inconvenience. As propane fueled systems move into the larger economy, this issue will need to be addressed with greater thought and care to make the tank less conspicuous to the urban homeowner. This issue will have far less impact for rural installations. It should be noted that Aloha Gas is providing fuel service at no cost to the base for the duration of the project as a means of gaining knowledge to support future fuel cell opportunities.

Figure 11.
Photo of 250 gallon LPGas supply tank located in Maj. Bain's back yard.

13.0 Installation Costs

MCBH Kaneohe Bay PEM Project				
1) Water (per 1,000 gallons)		$ 0.85		
2) Utility (per KWH)		$ 0.130		
3) LPGas (per gallon)		$ -		
First Cost			**Estimated**	**Actual**
Plug Power 5 kW SU-1			$ 75,000	$ 75,000.00
Shipping			$ 4,800	$ 1,200.00
Installation electrical			$ 4,875	$ 5,351.00
Installation mechanical, LPGas & thermal			$ 14,000	$ 8,946.00
Web Package			$ 2,000	$ 8,770.00
Site Prep, labor materials			$ 375	$ 375.00
Training			$ 4,500	$ 4,500.00
Lodging and Perdiem				$ 2,461.00
Technical Supervision/Start-up			$ 3,000	$ 3,000.00
Total			**$ 108,550**	**$ 109,603**
Assume Five Year Simple Payback			$ 21,710	$ 21,920.60
Forcast Operating Expenses	Vol/hr	$/Hr	$/ Yr	
LPGas gallons	0.5300	$ -	$ -	
Water Gallons per Year	14,016		$ 11.91	
Total Annual Operating Cost				$ 11.91
Economic Summary				
Forcast Annual kWH		19710		
Annual Cost of Operating Power Plant		$ 0.001	kWH	
Credit Annual Thermal Recovery Rate		($0.030)	kWH	
Project Net Operating Cost		($0.029)	kWH	
Displaced Utility cost		$ 0.130	kWH	
Energy Savings (Cost)		$ 0.159	kWH	

Explanation of Calculations:

Actual First Cost Total is a *sum* of all the listed first cost components.
Assumed Five Year Simple Payback is the Estimated First Cost Total *divided by* 5 years.

Forecast Operating Expenses:

LPGas usage in a fuel cell system set at 2.5 kW will consume 0.53 gallons LPGas per hour. The cost per hour is $0.0 gallons (fuel provided to the project free of charge) per hour *x* the cost of LPGas to the site. The cost at this site is $0.0 for fuel

GenSys fuel cell systems set at 2.5 kW will consume 1.6 gallons of water per hour through the DI panel. The total volume of water consumed at 14,016 gallons per year is 1.6 gph *x* 8760 hours per year. The cost per year at $170.01 is 14,016 gph *x* cost of water to the site at $12.13 per 1000 gallons.

The Total Annual Operating Cost, $11.91 is the *sum of* the cost per year for fuel and the cost per year for the water consumption.

Economic Summary:

The Forecast Annual kWh at 19,710 kWh is the product of 2.5 kW set-point for the fuel cell system *x* 8760 hours per year *x* 0.9. The 0.9 is for 90% availability.

The Annual Cost of Operating the Power Plant at $0.001 per kWH is the Total Annual Operating Cost of $11.91 *divided by* the forecast annual kWh of 19,710 kWh.

The Credit Annual Thermal Recovery at -$0.029/kWh is 7800 *divided by* 3414. This is then *multiplied by* 0.9 *x* 0.1 *x* the cost of electricity at $0.1300 per kWh *x* (-1). As a credit to the cost summary, the value is expressed as a negative number.

The Project Net Operating Cost is the *sum* of the Annual Cost of Operating the Power Plant *plus* the Credit Annual Thermal Recovery. In this case it is a negative number and a credit to the project since there is no cost for fuel. The project generates a net savings to the base, which in kWh is the sum of the displaced cost of grid power plus the savings expressed in kWh through thermal recovery

The Displaced Utility Cost is the cost of electricity to Kaneohe Bay per kWh.

Energy Savings (cost) equals the Displaced Utility Cost *minus* the Project Net Operating Cost.

Annual Energy Savings (cost) equals the Energy Savings *x* the Forecast Annual kWh.

Appendix

1) Monthly Performance Data
2) Data Graph of Power Generation
3) Work Log/Incident reports

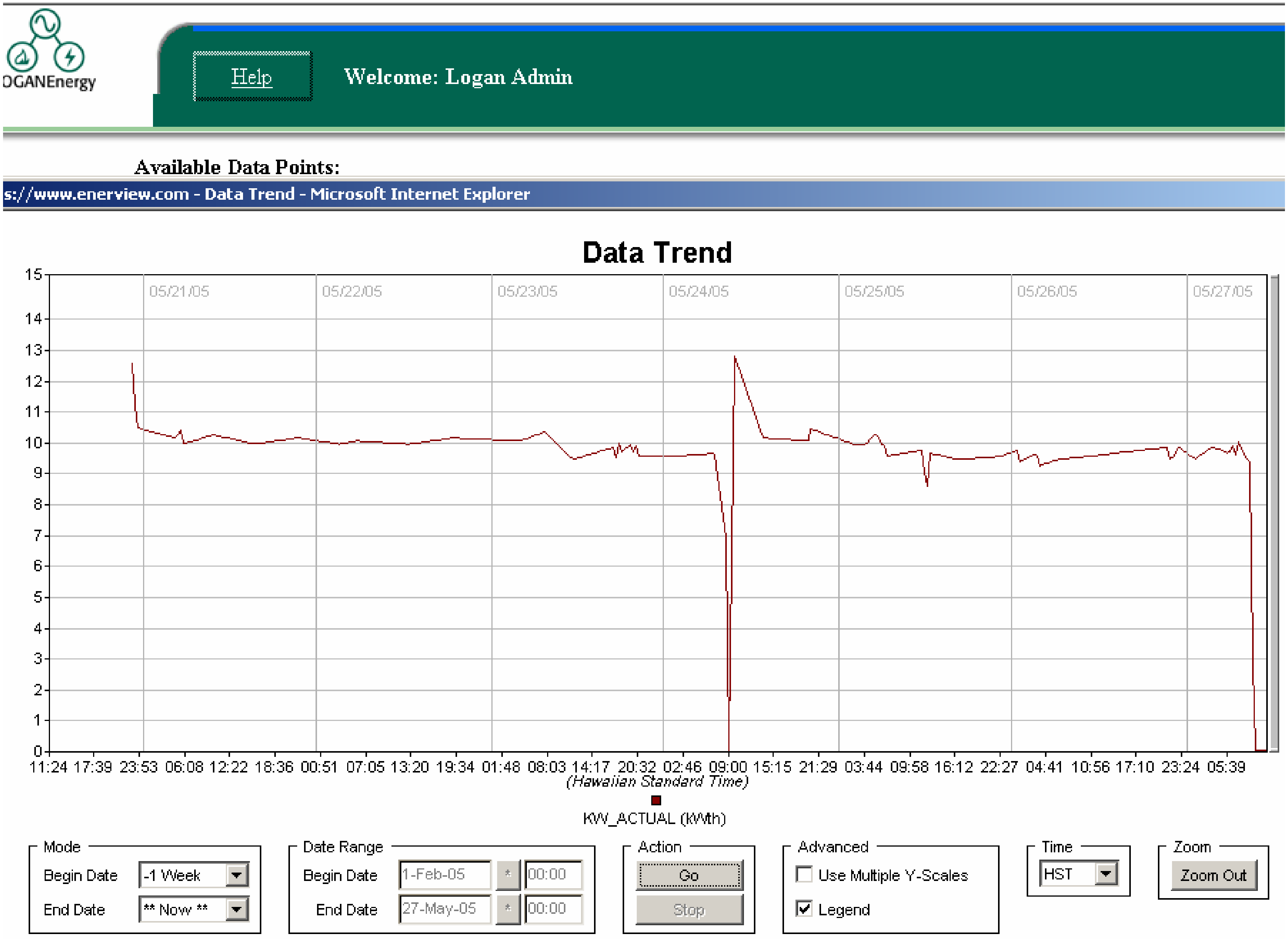
1) Monthly Performance Data

Suggested Format for PEM Fuel Cell Performance Data

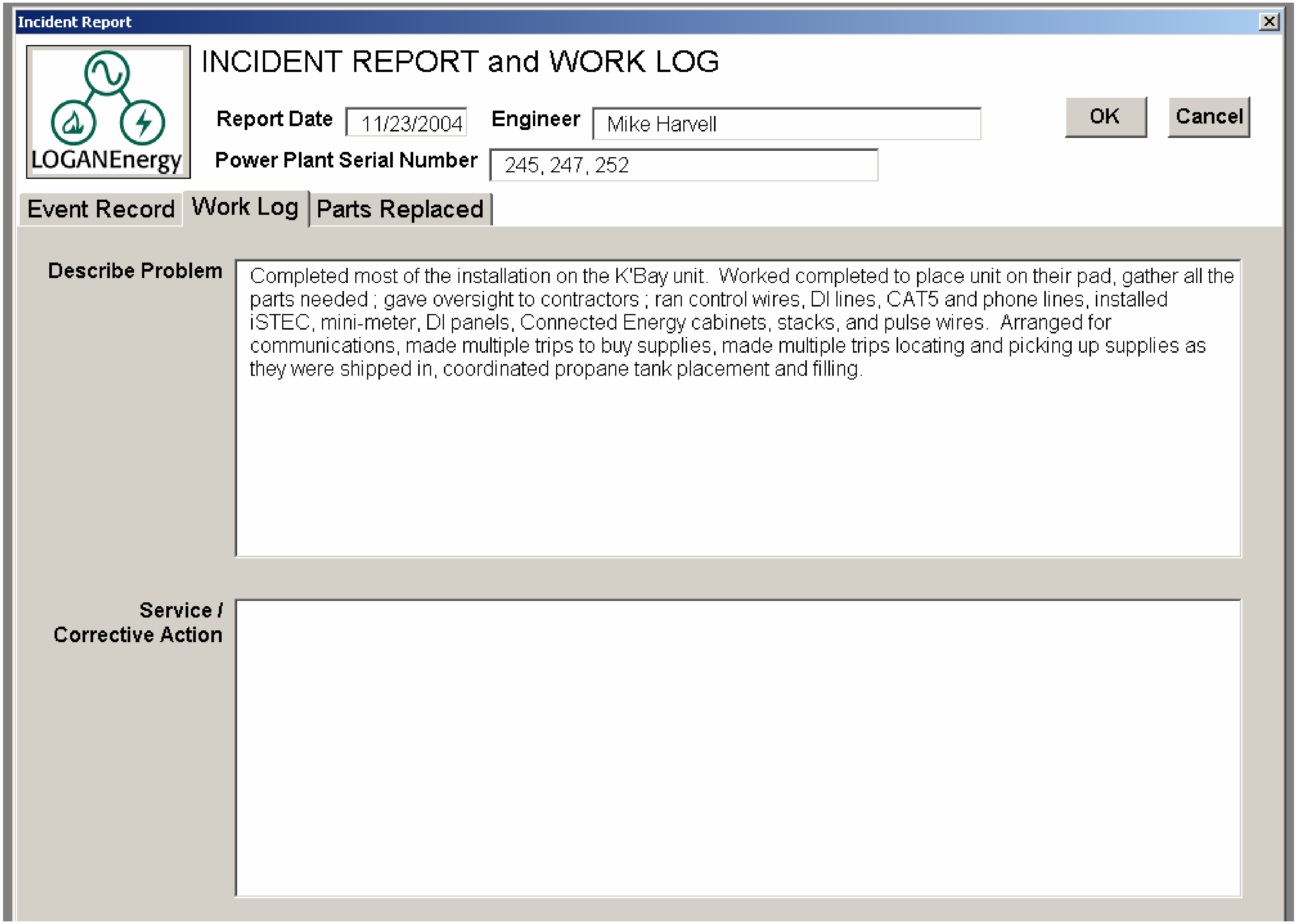
System Number:	**J01B000000245-LI**		**Commission Date:**	**3/1/2005**		**Site Location(City,State):**	**Honolulu, Hawaii**
Site Name:	**Kaneohe Bay**		**Fuel Cell Type:**	**Plug Power PEM**			
Fuel Type:	**LPG**		**Maintenance Contrac**	**LOGANEnergy Inc.**			
Lower Heating V	**943**	**BTU/scf**	**Local Residential Fue**	**LPGas $2.56/gallon**	**$/Therm**	**Local Base Fuel Cos**	**$0.00**	**$/Therm**
Capacity kW	**5**		**Local Residential Ele**	$ 0.13	**$/kWhr**	**Local Base Electricit**		**$/kWhr**

Month	Run Time (Hours)	Time in Period (Hours)	Availability (%)	Energy Produced (kWe-hrs AC)	Output Setting (kW)	Average Output (kW)	Capacity Factor (%)	Fuel Usage, LHV (kWh)	Fuel Usage, LHV (BTUs)	Fuel Usage (SCF)	Electrical Efficiency (%)	Heat Recovery (BTUs)	Recovery Rate (BTUs/hour)	Thermal Efficiency (%)	Overall Efficiency (%)	Number of Scheduled Outages	Scheduled Outage Hours	Number of Unsched Outages	Unsched Outage Hours
insert month	*insert operating hours*	*insert hours in month*	**1*	*insert produced energy*	*insert output setting*	**2*	**3*	*insert fuel consumption*			**4*	*insert heat recovery*	**5*	**6*	**7*	*insert value*	*insert value*	*insert value*	*insert value*
3/5	193	744	26%	493.0	2.5	2.55	13.25%	2211	7.54E+06	7458	22.31%	0	0	0.00%	22.31%	0	0	1	55
4/5	530	720	74%	1289.0	2.5	2.43	35.81%	5664	1.93E+07	19105	22.77%	0	0	0.00%	22.77%	0	0	1	19

2) Trending of power generation



2) Work Log/Incident reports


Incident Report

INCIDENT REPORT and WORK LOG

Report Date 11/23/2004 **Engineer** Mike Harvell

Power Plant Serial Number 245, 247, 252

OK Cancel

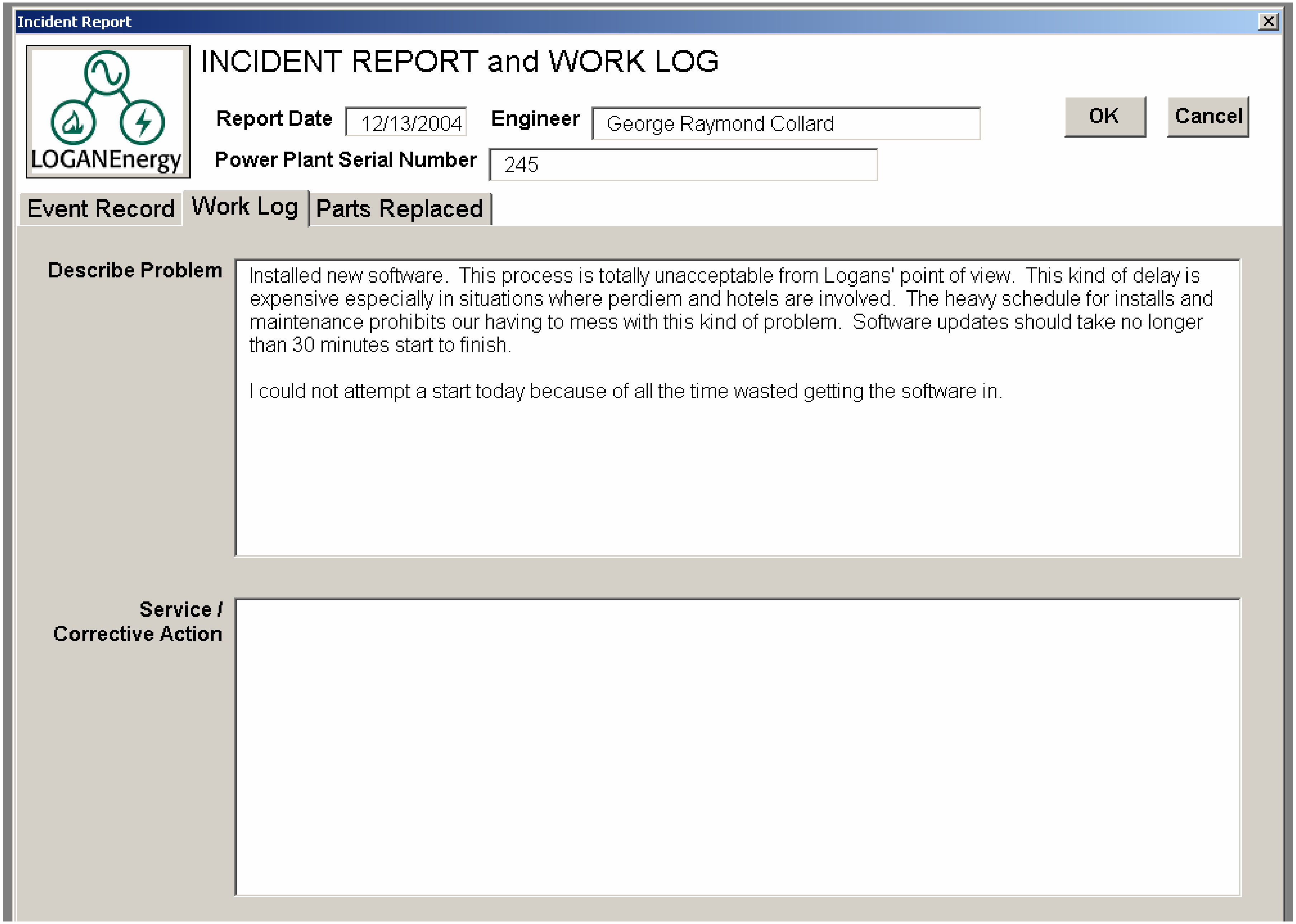
LOGANEnergy

Event Record | Work Log | Parts Replaced

Describe Problem

Completed most of the installation on the K'Bay unit. Worked completed to place unit on their pad, gather all the parts needed ; gave oversight to contractors ; ran control wires, DI lines, CAT5 and phone lines, installed iSTEC, mini-meter, DI panels, Connected Energy cabinets, stacks, and pulse wires. Arranged for communications, made multiple trips to buy supplies, made multiple trips locating and picking up supplies as they were shipped in, coordinated propane tank placement and filling.

Service / Corrective Action



Incident Report

INCIDENT REPORT and WORK LOG

LOGANEnergy

Report Date 12/13/2004 **Engineer** George Raymond Collard

Power Plant Serial Number 245

OK Cancel

Event Record | Work Log | Parts Replaced

Describe Problem

Installed new software. This process is totally unacceptable from Logans' point of view. This kind of delay is expensive especially in situations where perdiem and hotels are involved. The heavy schedule for installs and maintenance prohibits our having to mess with this kind of problem. Software updates should take no longer than 30 minutes start to finish.

I could not attempt a start today because of all the time wasted getting the software in.

Service / Corrective Action

Incident Report

LOGANEnergy

INCIDENT REPORT and WORK LOG

Report Date 12/14/2004 **Engineer** George Raymond Collard

Power Plant Serial Number 245

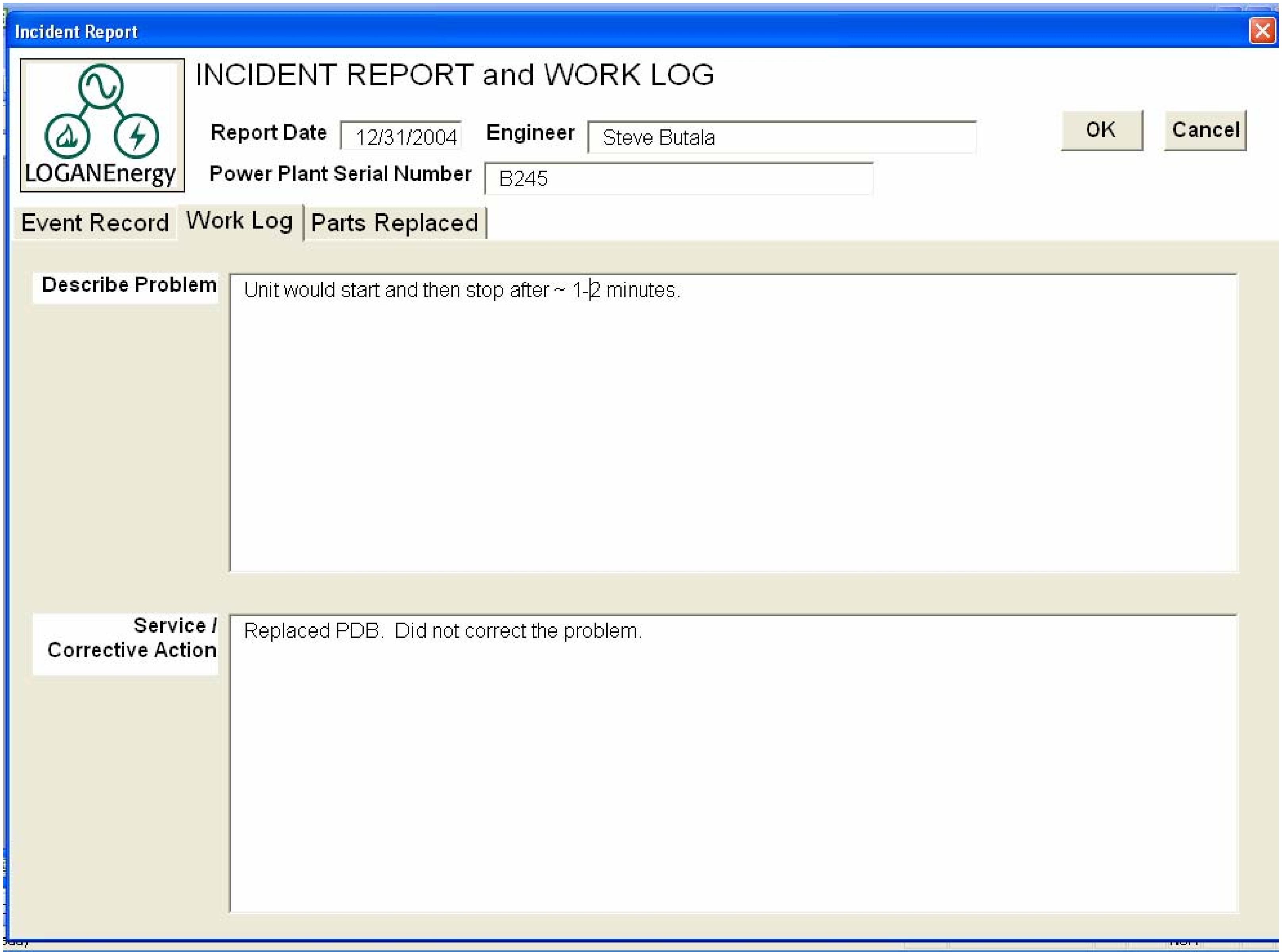
OK | Cancel

Event Record | Work Log | Parts Replaced

Describe Problem

Service / Corrective Action

Started this fuel cell with no issues. FC came on line with good voltage and 2.600 Kw output.
looks lke the software is ok at this point.
Checked heat recovery. It is working well.
High speed internet connection is working well. Plugged it into the connected energy box. I need to send email to Kevin Haan at CE to have him activate this site.
This machine looks good and we should be able to start the acceptance day in the morning.
I called the modemwith my phone and the modem answered. I'll call the FC from my room tonight.



Incident Report

LOGANEnergy

INCIDENT REPORT and WORK LOG

Report Date 12/31/2004 Engineer Steve Butala

Power Plant Serial Number B245

OK Cancel

Event Record | Work Log | Parts Replaced

Describe Problem

Unit would start and then stop after ~ 1-2 minutes.

Service / Corrective Action

Replaced PDB. Did not correct the problem.

Incident Report

INCIDENT REPORT and WORK LOG

LOGANEnergy

Report Date 1/10/2005 **Engineer** Steve Butala

Power Plant Serial Number B245

OK | Cancel

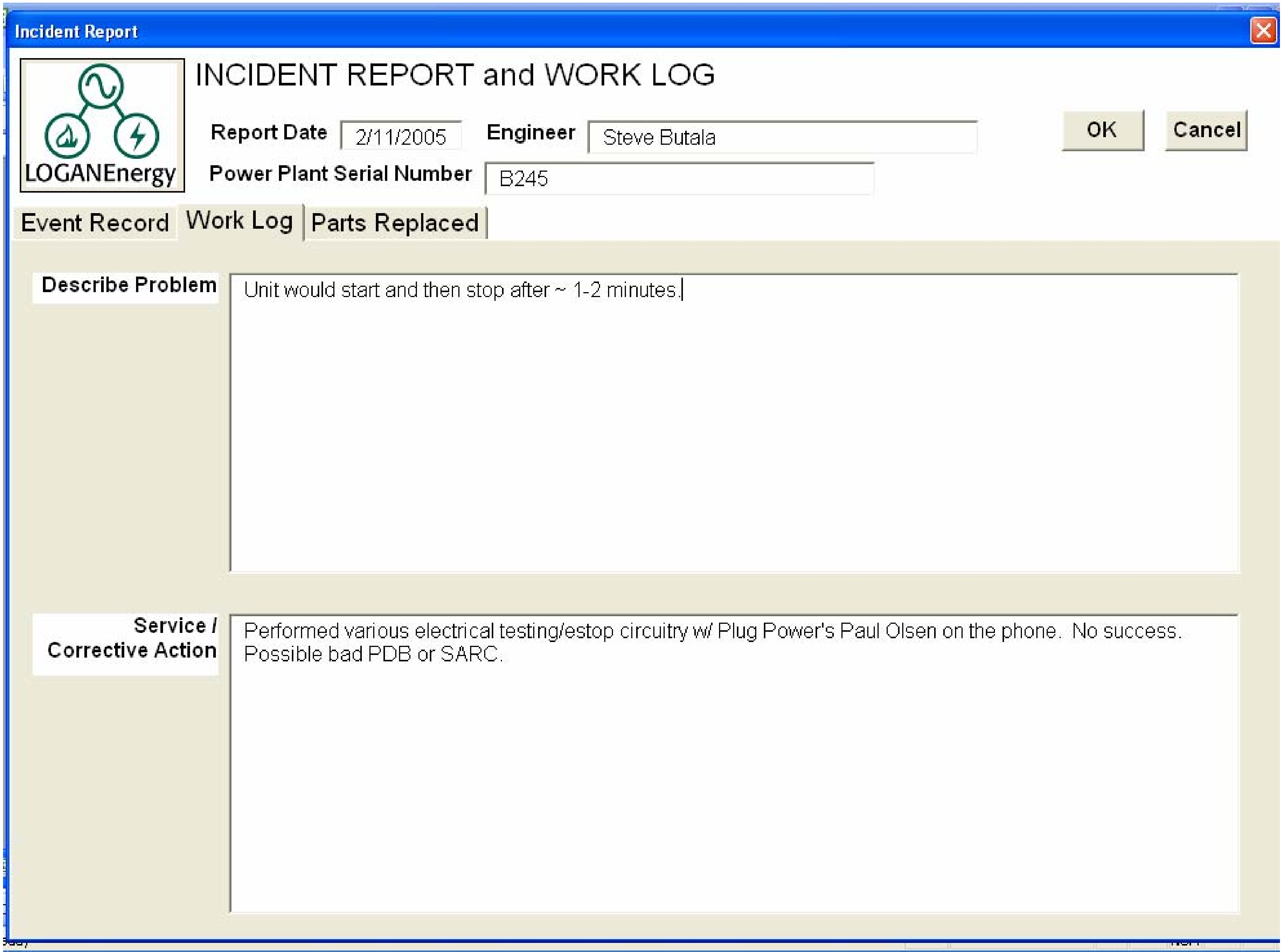
Event Record | Work Log | Parts Replaced

Describe Problem

Unit would start and then stop after ~ 1-2 minutes.

Service / Corrective Action

Performed various electrical testing w/ George Collard on the phone. No success. Possible bad PDB or SARC.



Incident Report

INCIDENT REPORT and WORK LOG

LOGANEnergy

Report Date: 2/11/2005

Engineer: Steve Butala

Power Plant Serial Number: B245

OK | Cancel

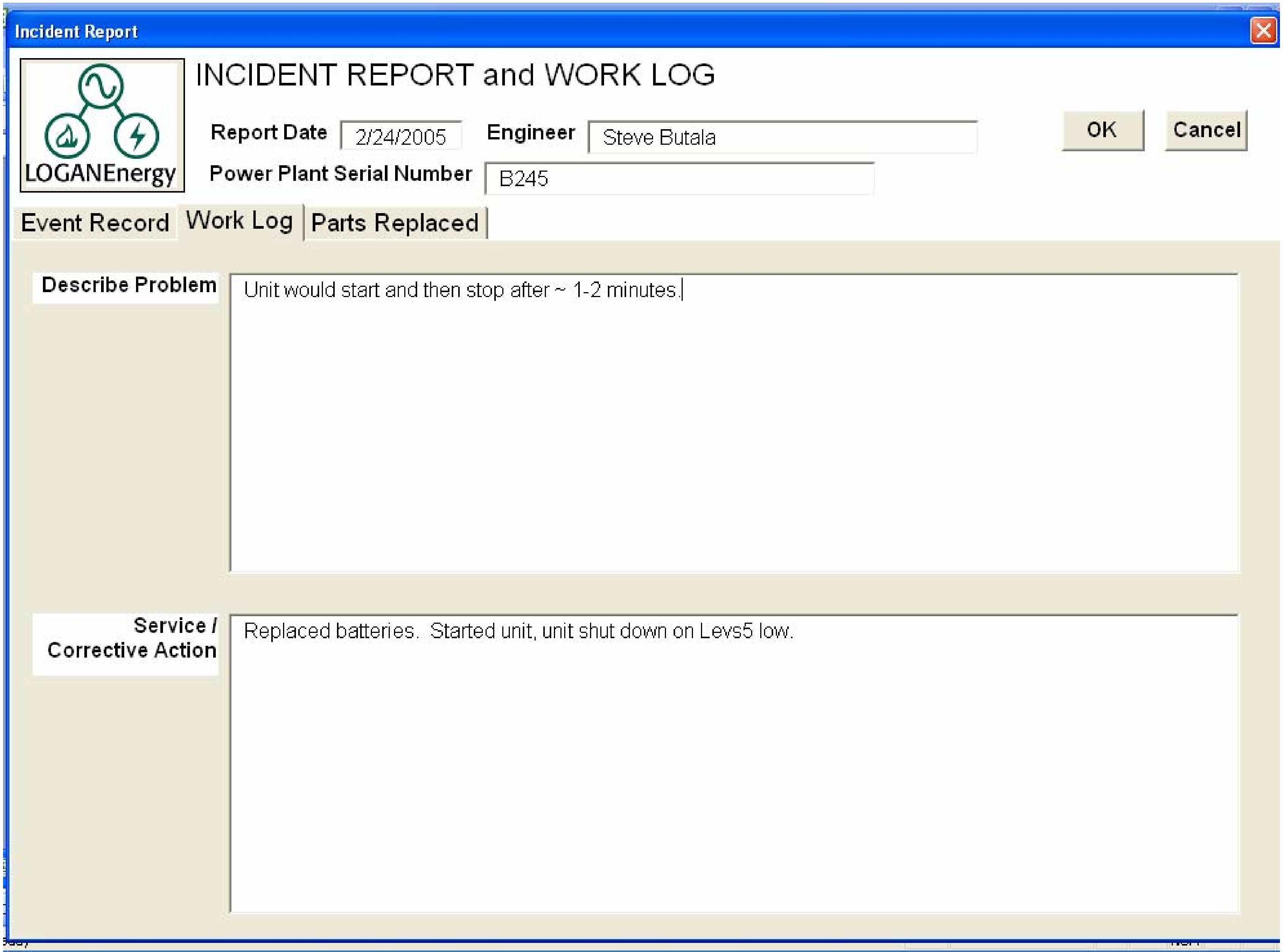
Event Record | Work Log | Parts Replaced

Describe Problem

Unit would start and then stop after ~ 1-2 minutes.

Service / Corrective Action

Performed various electrical testing/estop circuitry w/ Plug Power's Paul Olsen on the phone. No success. Possible bad PDB or SARC.



Incident Report

INCIDENT REPORT and WORK LOG

LOGANEnergy

Report Date: 2/24/2005

Engineer: Steve Butala

Power Plant Serial Number: B245

OK | Cancel

Event Record | Work Log | Parts Replaced

Describe Problem: Unit would start and then stop after ~ 1-2 minutes.

Service / Corrective Action: Replaced batteries. Started unit, unit shut down on Levs5 low.

Incident Report

INCIDENT REPORT and WORK LOG

LOGANEnergy

Report Date 2/28/2005 **Engineer** Steve Butala

Power Plant Serial Number B245

OK Cancel

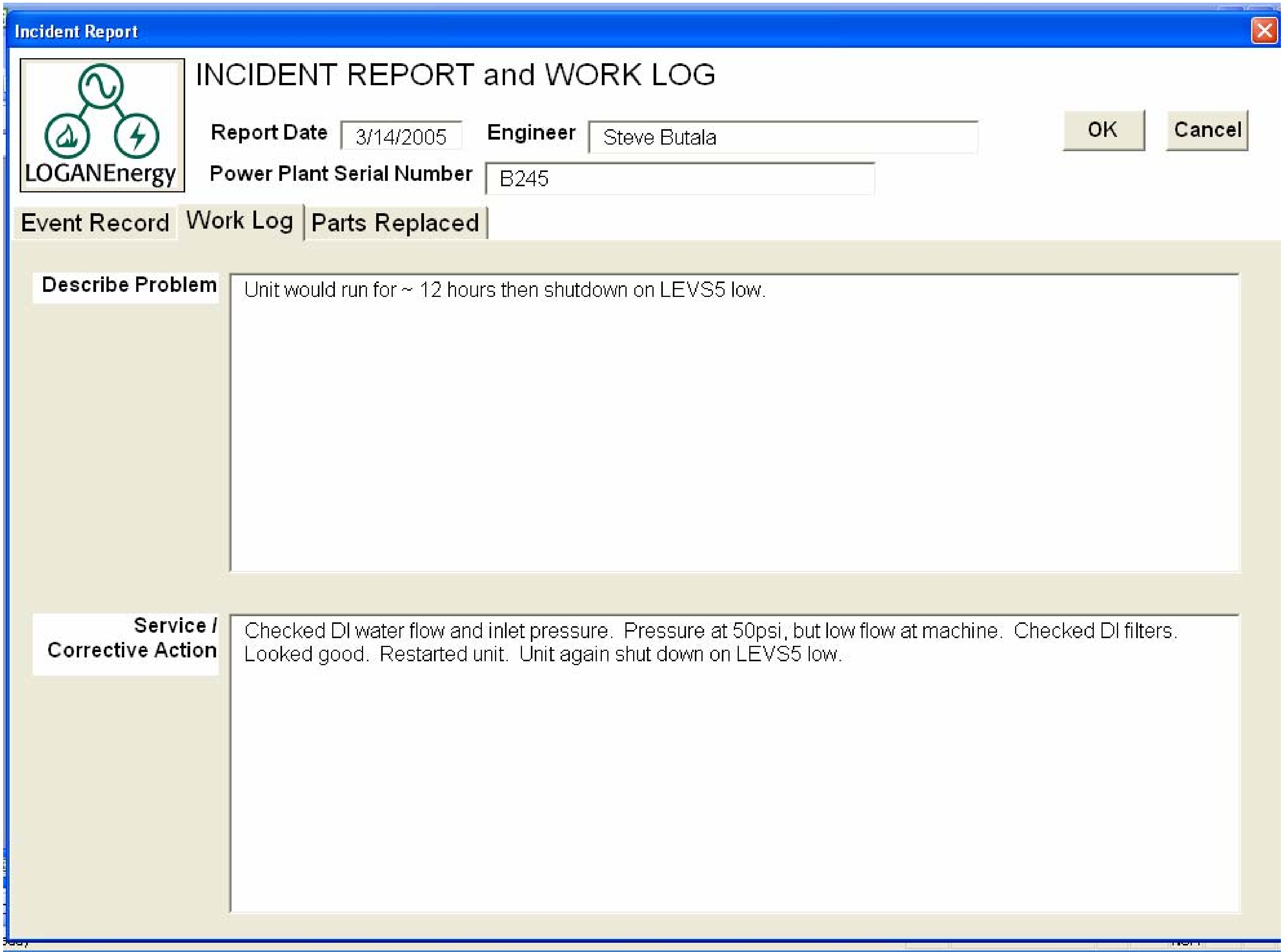
Event Record | Work Log | Parts Replaced

Describe Problem

Unit would run for ~ 12 hours then shutdown on LEVS5 low.

Service / Corrective Action

Checked DI water flow and inlet pressure. Adjusted pressure from 40 psi to max available 48psi. Restarted unit. Unit again shut down on LEVS5 low.



Incident Report

INCIDENT REPORT and WORK LOG

LOGANEnergy

Report Date: 3/14/2005

Engineer: Steve Butala

Power Plant Serial Number: B245

OK | Cancel

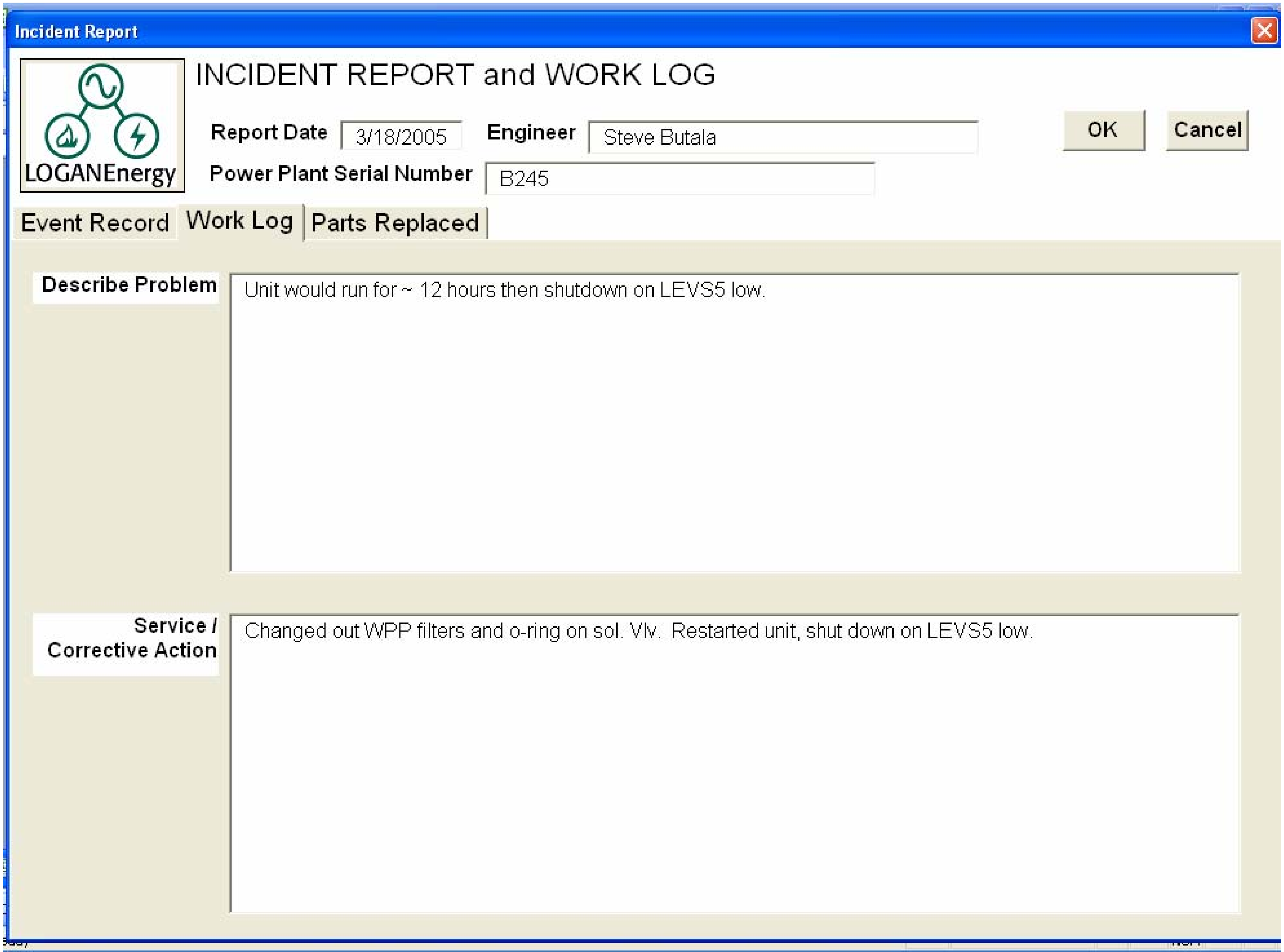
Event Record | Work Log | Parts Replaced

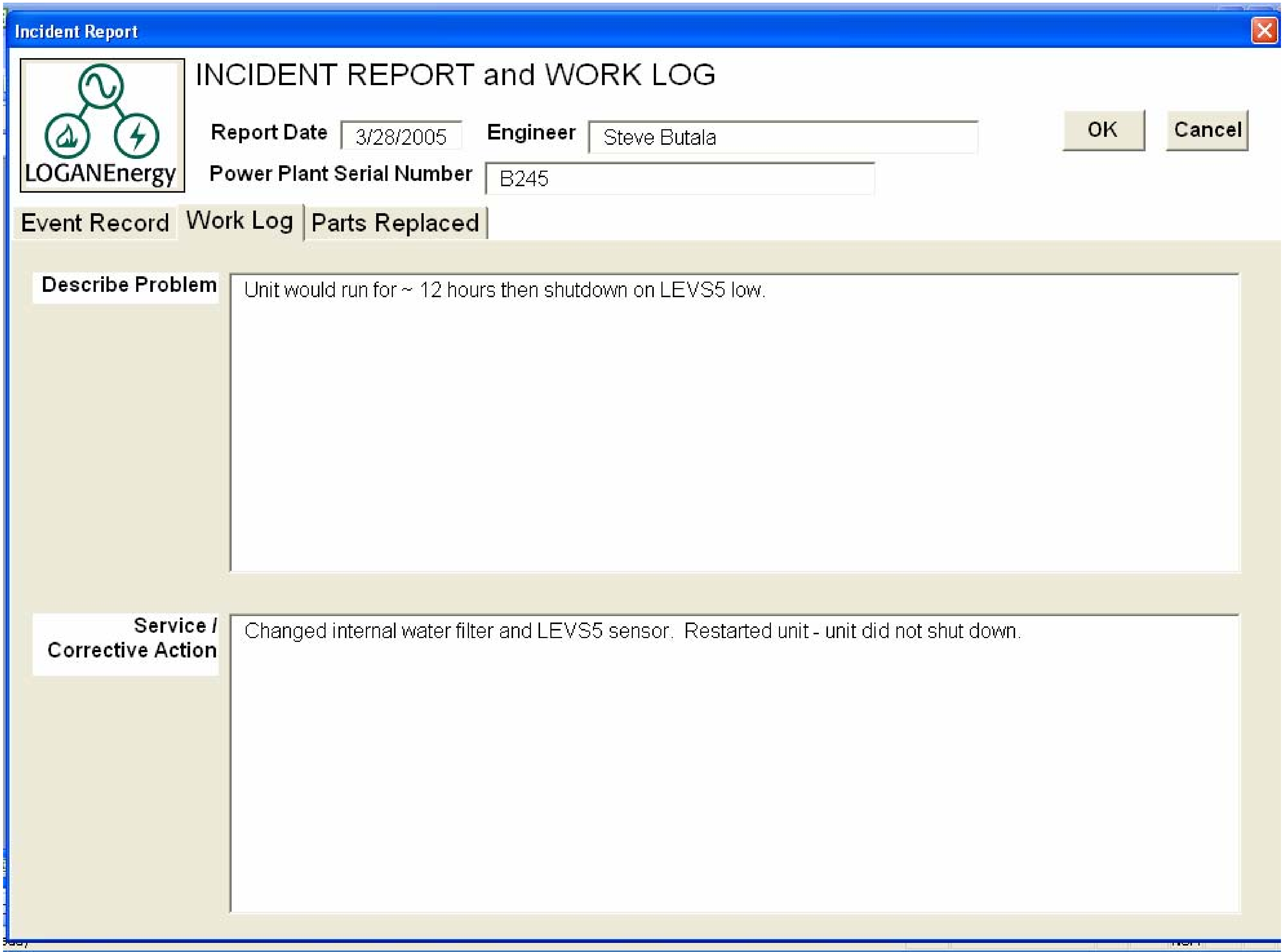
Describe Problem

Unit would run for ~ 12 hours then shutdown on LEVS5 low.

Service / Corrective Action

Checked DI water flow and inlet pressure. Pressure at 50psi, but low flow at machine. Checked DI filters. Looked good. Restarted unit. Unit again shut down on LEVS5 low.


Incident Report
LOGANEnergy
INCIDENT REPORT and WORK LOG
Report Date
3/18/2005
Engineer
Steve Butala
OK
Cancel
Power Plant Serial Number
B245
Event Record
Work Log
Parts Replaced
Describe Problem
Unit would run for ~ 12 hours then shutdown on LEVS5 low.
Service / Corrective Action
Changed out WPP filters and o-ring on sol. Vlv. Restarted unit, shut down on LEVS5 low.



Incident Report

INCIDENT REPORT and WORK LOG

LOGANEnergy

Report Date 3/28/2005 **Engineer** Steve Butala

Power Plant Serial Number B245

OK Cancel

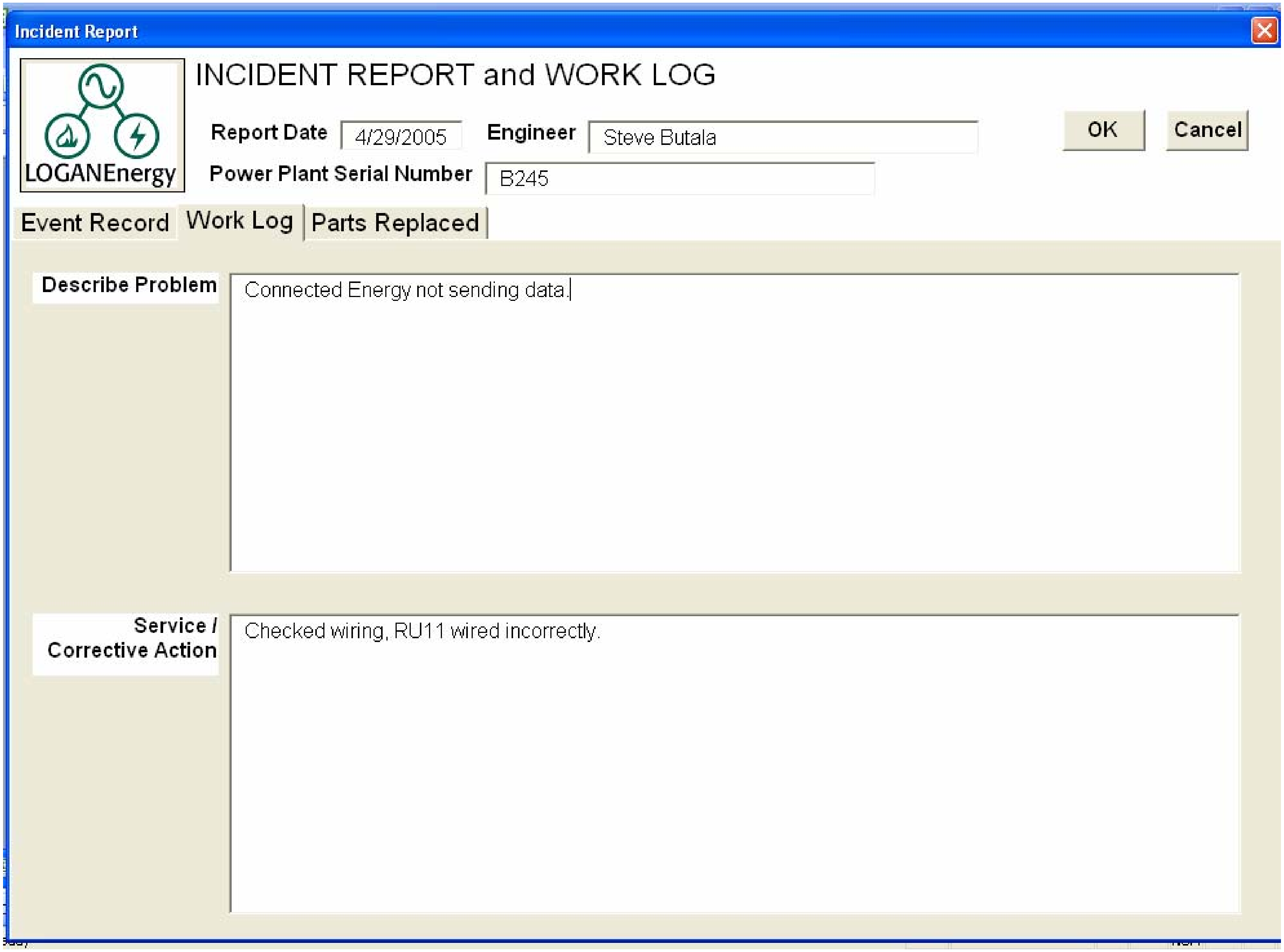
Event Record | Work Log | Parts Replaced

Describe Problem

Unit would run for ~ 12 hours then shutdown on LEVS5 low.

Service / Corrective Action

Changed internal water filter and LEVS5 sensor. Restarted unit - unit did not shut down.



Incident Report

INCIDENT REPORT and WORK LOG

Report Date: 4/29/2005
Engineer: Steve Butala
Power Plant Serial Number: B245

OK | Cancel

Event Record | Work Log | Parts Replaced

Describe Problem: Connected Energy not sending data.

Service / Corrective Action: Checked wiring, RU11 wired incorrectly.

Incident Report

LOGANEnergy

INCIDENT REPORT and WORK LOG

Report Date 5/10/2005 **Engineer** Steve Butala

Power Plant Serial Number B245

OK Cancel

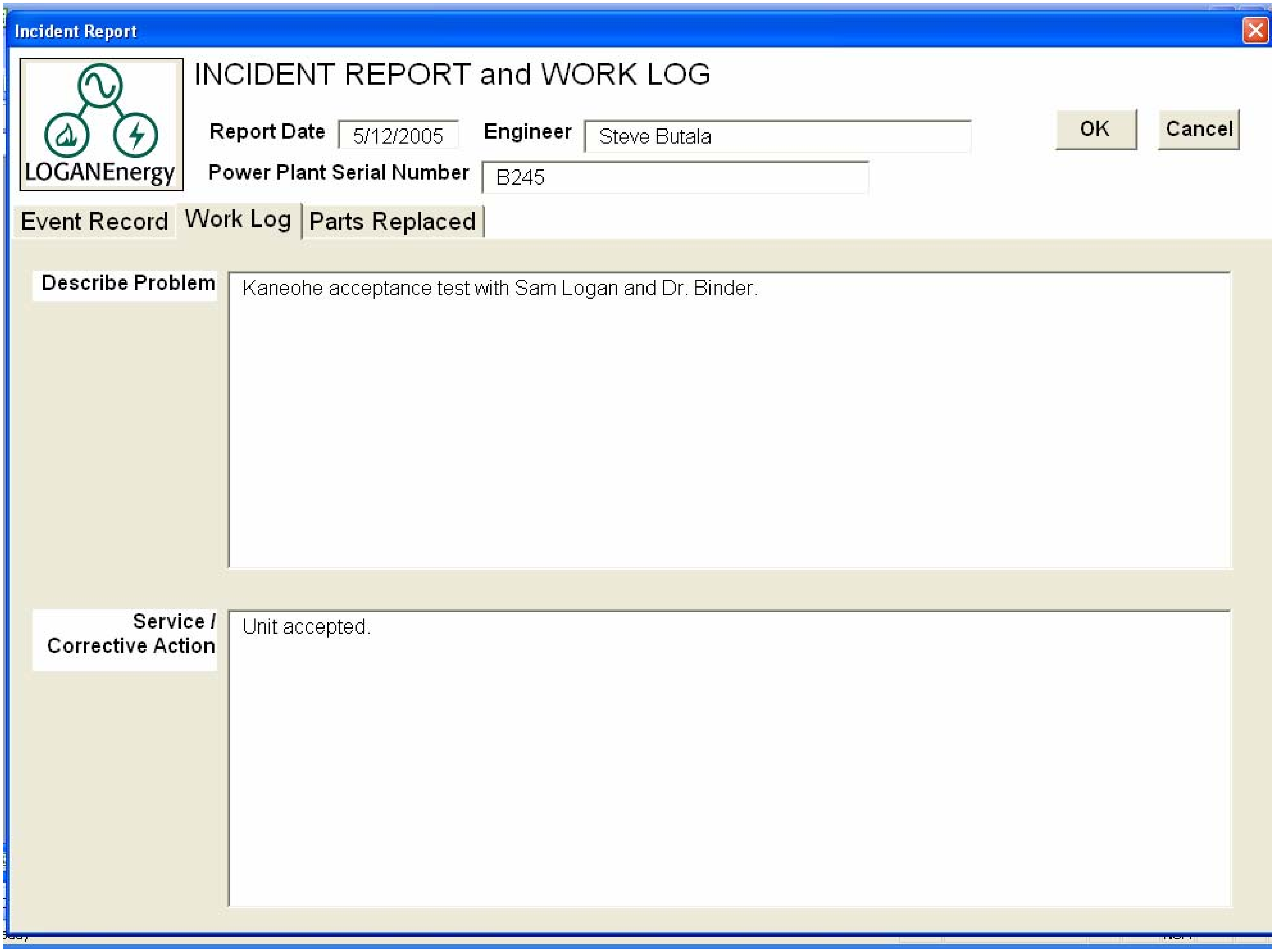
Event Record | Work Log | Parts Replaced

Describe Problem

Connected Energy not sending data. CHP piped incorrectly.

Service / Corrective Action

Worked with Mark Ginther of CE on wiring. CE getting intermittant data. Plumbers replumbed CHP piping.



Incident Report

INCIDENT REPORT and WORK LOG

Report Date: 5/12/2005

Engineer: Steve Butala

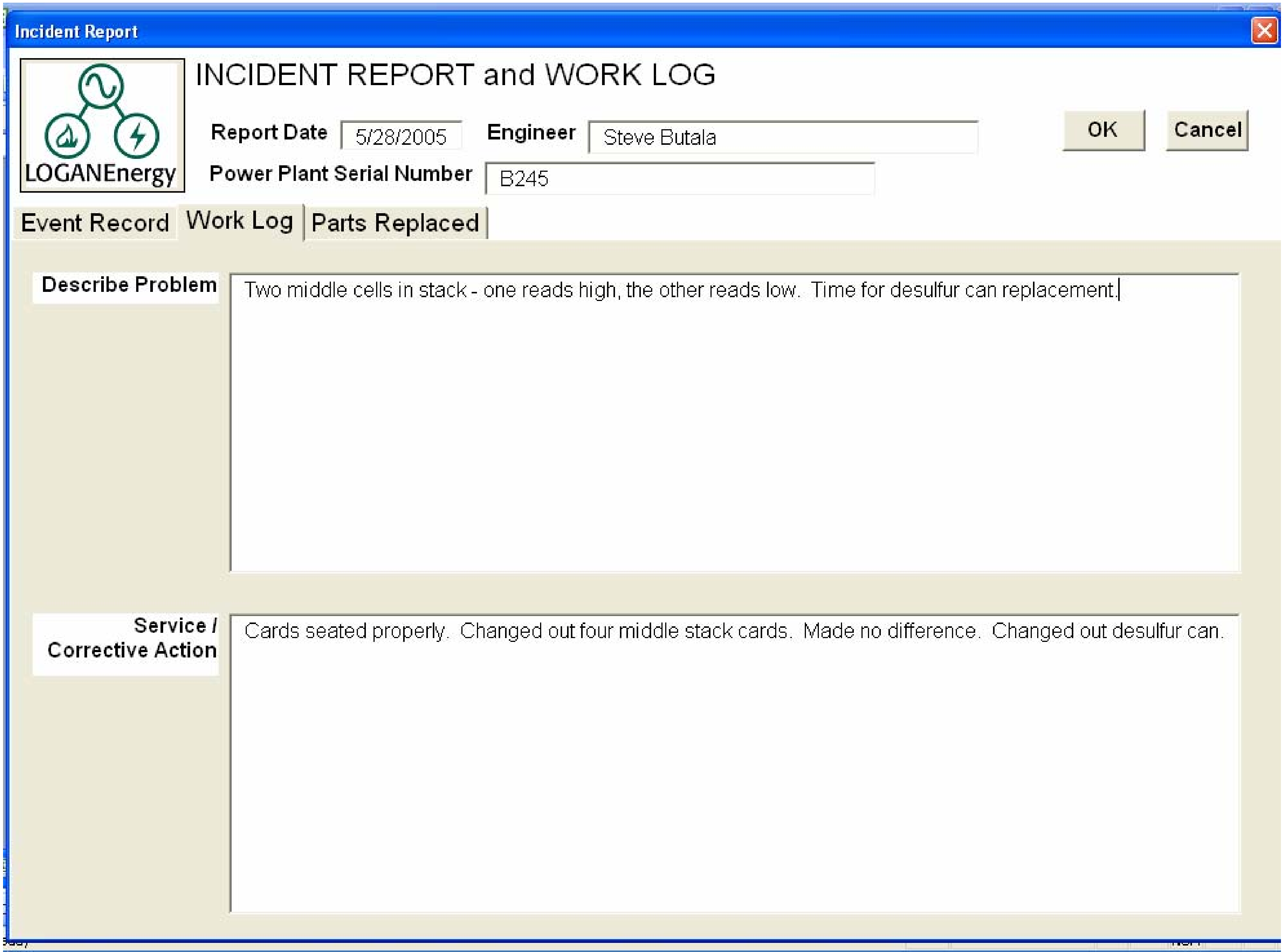
Power Plant Serial Number: B245

OK | Cancel

Event Record | Work Log | Parts Replaced

Describe Problem: Kaneohe acceptance test with Sam Logan and Dr. Binder.

Service / Corrective Action: Unit accepted.


Incident Report

INCIDENT REPORT and WORK LOG

LOGANEnergy

Report Date 5/28/2005

Engineer Steve Butala

Power Plant Serial Number B245

OK

Cancel

Event Record | Work Log | Parts Replaced

Describe Problem

Two middle cells in stack - one reads high, the other reads low. Time for desulfur can replacement.

Service / Corrective Action

Cards seated properly. Changed out four middle stack cards. Made no difference. Changed out desulfur can.